Assessing explicit error reporting in the narrative electronic medical record using keyword searching

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In this study, we assessed the explicit reporting of medical errors in the electronic record. We looked for cases in which the provider explicitly stated that he or she or another provider had committed an error. The advantage of the technique is that it is not limited to a specific type of error. Our goals were to 1) measure the rate at which medical errors were documented in medical records, and 2) characterize the types of errors that were reported.

Introduction

The critical step for managing and preventing medical errors is identifying them. Even though many studies have detected medical adverse events and errors, few studies have assessed the way care providers actually document adverse events or errors in the electronic medical record.

Methods

We selected five terms to survey discharge summaries from 1991 to 2000, signout notes since 1994 and outpatient notes since 1996: "mistake", "error", "incorrect", "inadvertent" and "iatrogenic". A case was considered to be positive if one of search terms was detected in it. One of the authors (HC) manually reviewed the positive cases and identified the type of medical error based on manual review of the notes. We adopt the following definition of a medical error: *A medical error is the failure of a planned action to be completed as intended or the use of wrong action to achieve an aim.*

Results

We identified 242 reported medical errors totally. The predictive value varied with different keywords. In general, the predict value for each keyword is low, ranging from 3.38% to 24.36% (See Table1). Therapeutic errors were most common reported errors and most of those were medication errors. For the 222 medical errors detected in discharge summaries, 138 errors were detected in the section "hospital course," 53 errors were detected in the section "history of present illness" and 31 errors were detected elsewhere. "Hospital Course" and "History of Present Illness" were the sections where physicians were most likely to document errors.

Discussion

Our study indicates that physicians do report medical errors in medical records, which have been neglected by most researchers. Free-text searching for these explicitly reported errors helps to collect information about many near-misses and errors that only result in minor injuries. In our study we found most new errors were reported shortly after they happened. They may provide the first-hand information for investigating the events promptly.

Conclusion

Keyword searches combined with manual review indicated the proportion of medical errors that were reported in medical records. It had a low sensitivity and a moderate positive predictive value, which varied by search term. The reported errors in medical records covered a broad range and were related to all kinds of care providers as well as non health care professionals. Medication errors were the most common errors explicitly documented in medical records.

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Table 1: Errors detected.

	Discharge Summary (n=286,000)			Sign out Note (n=48,000)			Outpatient Note (n=49,500)		
Keyword	Cases	Events	PPV(%)	Cases	Events	PPV(%)	Cases	Events	PPV(%)
Mistake	462	48	10.39	11	4	36.36	56	9	16.07
Error	1570	53	3.38	37	4	10.81	76	1	1.32
Inadvertent	275	67	24.36	5	1	20.0	9	2	22.22
Incorrect	267	33	12.36	12	0	0	50	0	0
Iatrogenic	170	23	13.53	10	2	20.0	0	0	0
Total	2744	222*	8.09	75	11	14.67	191	9*	4.71

(*Number is not the sum because one case can be detected by more than one term.)